approaches most nearly to *Ectatotarsus*. No doubt many new and intermediate forms remain to be brought to light from among the numerous islands of the Pacific, few of which have as yet been visited by the naturalist, but every one of them probably having its own endemic species *.

Bythoprotus lineatus.

B. niger, subnitidus, albo lineatus; prothorace corrugato, metallico-viridi; elytris basi albo maculatis.

Black, slightly shining, with remotely scattered, greyish-white, squamulose hairs, occasionally collected together and forming lines; head closely punctured, a line over each eye, and another in front; antennæ compressed, shorter than the body, inserted in a large deep fovea, the basal joint short, ventricose, the second about the same length, obconical, the third three times, the rest to the eighth twice the length of the second, and all, except the basal, fluted on both sides, the last three together not longer than the third, and scarcely thicker than the rest; prothorax very slightly convex, finely corrugated transversely, dull metallic green, with five narrow longitudinal lines; scutellum small; elytra nearly covering the abdomen, rather short, broadest at the shoulders, the sides rounded, a large white spot at the base, and six lines on each, which are united at the apex; legs black, claws deeply bifid; body beneath smooth, glossy greenish black, last abdominal segment with a strong tooth on each side; pro- and mesosterna elevated, continuous. Length 9 lines.

LI.—*A Catalogue of the Zoophytes of South Devon and South Cornwall.* By the Rev. Thomas Hincks, B.A.

[Continued from p. 310.]

[Plate XVI.]

Fam. Diastoporidæ, Busk.

1. Diastopora, Lamouroux.

D. obelia, Fleming.

Very common, on shells, &c., from moderate depths and from deep water.

* M. le père Montrouzier, a French missionary, has been for some time sending collections from some of these islands—Woodlark, Lifu, Balade, Art, &c.—to Paris, and they are being published in the 'Annales' of the French Entomological Society. They appear to be, almost without exception, new to science.

2. Patinella, Gray.

P. patina, Lamarck.

Very common, on shells, stones, &c., from moderate depths to 40 fathoms.

From Torbay and from deep water off the Cornish coast, I have very beautiful specimens, which are proliferous in habit, bearing the young on the margin of the cup. In one case as many as five are present, occupying the greater portion of the edge of the disk. A similar condition is met with in the *P. proligera* of Mr. Busk's 'Monograph on the Crag Polyzoa,' and may prove to be common throughout the genus. It has never come under my observation, however, except in the case of the specimens to which I have referred, nor have I met with any account of its occurrence in a recent species. The cup in this proliferous form is deep and funnel-shaped, and stands erect, being attached by only a small portion of the base. The young are developed on the cellular border, just within the basal lamina.

Dr. Johnston states that the cells of this species have "a plain circular aperture." But both the upper and lower margins are frequently produced into a strong mucro, the orifice appearing bifid when viewed sideways.

3. Discoporella, Gray.

D. flosculus, n. sp. Pl. XVI. fig.

Polyzoary discoid, bordered with a thin margin; cells much raised, with a strong mucro on the upper edge, united together in regularly radiating rows, alternately longer and shorter, which are separated by reticulated spaces; the centre of the disk a depressed area, reticulated, with two or three large oblong openings placed near the edge of it.

Not common, on weed and shell: Brixham; Salcombe Bay.

The polyzoary forms a circular convex disk, about $\frac{1}{8}$ inch, or rather more, in diameter, resting on a thin base, which is adnate throughout; the entire surface is reticulated. The cell-tubes are much raised, and united together in radiating rows, with reticulated grooves between them. The uppermost cell-tubes are the longest, and they gradually diminish in height as they approach the margin. The rows of cells are alternately longer and shorter, the former radiating from the border of the central area to the margin of the disk, the others extending only about half the distance. The upper edge of the cells is strongly mucronate. At the top of the polyzoary there is a somewhat concave area, closely reticulated, and with a variable number (generally

three) of oblong orifices, with raised margin, the nature of which I have had no opportunity of determining.

I was at one time inclined to regard the *first* of the varieties of *Tubulipora hispida* described by Johnston (p. 269) as identical with the *Discoporella flosculus*; but I am now convinced that he had in view the early state of *Heteroporella hispida*, which is at first a simple subconical disk, somewhat "dimpled" at the centre, with radiating rows of cells, which are but little elevated, and are "closely compacted near the circumference." The large adult specimens seem to be formed by successive buddings from the margin, the cluster of disks thus produced gradually coalescing so as to constitute a composite structure, with many papillary prominences studding the surface.

In *D. flosculus* the polyzoary is always simple, circular in shape, and of small size.

[Coast of Labrador, on weed.]

4. Heteroporella, Busk.

H. hispida, Fleming.

Discopora hispida, Fleming, Brit. Anim. 530.
Tubulipora hispida, Johnston, Brit. Zooph. 268, pl. 47. figs. 9, 10, 11.
Discopora hispida, Couch, Cornish Fauna, 109, pl. 19. fig. 1.
?*Heteroporella radiata*, Busk, Crag Polyzoa, 127, pl. 19. fig. 2.

Very abundant on stones, shells, &c., from moderate depths to deep water (60 fathoms).

The *Discopora hispida* of Fleming, a very common British species, must be assigned to the *Heteroporella* of Busk, a genus lately constituted for the reception of two Crag forms, which agree with the *Heteropora* of De Blainville in having "openings of two distinct kinds" on the surface, but differ from it in being adnate and incrusting, instead of erect. One of these fossil species, the *H. radiata*, appears to be identical with the present form. The mouths of its cell-tubes, indeed, are described as "simple and even with the surface," whereas in *H. hispida* they are raised and spinous in the perfect state. But even in recent specimens the erect portions are often wanting, and the surface is uniformly porous.

Dr. Johnston has described two varieties of his *Tubulipora hispida*, which are only, I believe, the young and adult states of the *Discopora hispida* of Fleming. His figures (pl. 47. figs. 9, 10, 11) are indifferent representations of this form.

The *Discopora hispida* of Couch's 'Cornish Fauna' is also Fleming's species.

I am indebted to Mr. Holdsworth for drawing my attention to the fact that it belongs to the genus *Heteroporella*.

H. hispida often attains a very considerable size. A specimen

from deep water off the Cornish coast measures more than $1\frac{1}{2}$ inch in circumference, and is covered with about thirty of the little "papillary eminences" which are so characteristic of the species. The intercellular pores present the pretty stellate appearance which Mr. Busk has noticed in *Heteropora clavata*.

[Isle of Man; Rothesay Bay, mouth of the Clyde; Shetland, &c.]

Fam. **Crisiadæ**.

1. Crisia, Lamouroux.

1. *C. eburnea*, Linnæus.

Common.

2. *C. denticulata*, Lamarck.

Very common: abundant in Salcombe Bay, &c.

2. Crisidia, Milne-Edwards.

C. cornuta, Linnæus.

Common in Devon; Cornwall (*Couch*).

The only *Crisidia* which I have met with is the form in which the spine springs from the side of the cell beneath the aperture. This is the *C. setacea* of Couch, but is probably only a variety of the *C. cornuta*.

Suborder **Ctenostomata**, Busk.

Fam. **Alcyonidiadæ**.

1. Alcyonidium, Lamouroux.

1. *A. gelatinosum*, Pallas.

Salcombe Bay, Devon; Cornwall, "on shells and stones from deep water; not rare on the south and south-west coast" (*Couch*).

2. *A. hirsutum*, Fleming.

Common between tide-marks. This species attains a large size on the South-Devon coast, forming very beautiful palmate masses, variously lobed.

In its crustaceous state, it is the *Cycloum papillosum* of Hassall.

3. *A. parasiticum*, Fleming.

Not common: Salcombe Bay; Cornwall.

4. *A. hexagonum*, Hincks.

Very common, on stones, weed, &c., between tide-marks, and also from moderate depths.

5. *A. polyoum*, Hassall.

Torbay, between tide-marks, encrusting shells of *Trochus cinereus*.

The form here intended, which I believe to be distinct from *A. hexagonum*, seems to agree with the *Sarcochitum polyoum* of Hassall. There is no sufficient ground for separating it from the genus *Alcyonidium*.

2. Arachnidia, nov. gen.

Polyzoary membranaceous, forming a delicate network; cells separate, distant, adnate, connected by a creeping, anastomosing fibre.

A. hippothooides, n. sp. Pl. XVI. fig. 2.

Cells lozenge-shaped, or rudely fusiform, of a light horn-colour, with fibrous processes round the margin; orifice near the upper extremity of the cell.

On shell, Torbay.

The *Arachnidia* may be regarded as an *Alcyonidium* with its cells detached from one another, and held together by a delicate thread, instead of being immersed in a fleshy crust. Occasionally the cells are massed together, but usually they are separated by considerable intervals, and connected by a fibre which passes off from the two extremities and from about the middle of each side. The habit of the *Hippothoa* is curiously imitated by this species.

The form of the cells is somewhat irregular, and the fibrous processes round the margin are not easily detected, unless the specimen can be viewed with transmitted light. When the *Arachnidia* spreads over the surface of a shell, it is almost impossible to make them out.

[On a *Cyprina*, dredged off the Isle of Man (*T. H.*); on shell and the test of an Ascidian, Lulworth Cove (*Mr. Alder*).]

Fam. **Vesiculariadæ.**

1. Vesicularia, J. V. Thompson.

V. spinosa, Linn.

Not uncommon amongst the Brixham trawl-stuff; "deep water off the Deadman, rare" (*Couch*).

[Filey, Yorkshire; Lytham, Lancashire; Llandudno, North Wales.]

2. Amathia, Lamouroux.

A. lendigera, Linn.

Very common: in great luxuriance on *Halidrys siliquosa*, under the rocky shores of Salcombe Bay, &c.

3. Buskia, Alder.

B. nitens, Alder.

Dredged in Salcombe Bay, on *Calicella dumosa*.
[Filey, Yorkshire; Llandudno, North Wales.]

4. Valkeria, Fleming.

1. *V. Cuscuta*, Linn.

Not uncommon, in tide-pools, on Coralline and weed; Torquay; near Plymouth, of remarkable size and beauty, &c.
[Llandudno, on *Halidrys*; Filey; Ramsay, Isle of Man.]

2. *V. Uva*, Linn.

Common, under stones, on Corallines, *Sertularia pumila*, &c., between tide-marks.

3. *V. pustulosa*, Ellis & Solander.

Dredged abundantly in Salcombe Bay; "Fowey Harbour, and off Goran, Cornwall, very rare" (*Peach*).
This species grows in dense arborescent masses, and sometimes attains the height of 4 inches.
[Llandudno, North Wales; Filey.]

4. *V. tremula*, n. sp. Pl. XII. fig. 9.

Stem creeping; cells elongate, tapering to a point below, very small and slender.

Salcombe Bay, on *Flustra chartacea*.

This is a very minute species. It may be known at once by its delicate tapering cells, which terminate in a point below. They seem to be very slightly attached to the creeping stem, and droop a little to one side when the polypide retracts itself.
I have met with what I take to be the same species on shell dredged off the Isle of Man.

5. Mimosella, Hincks.

M. gracilis, Hincks. Pl. XVI. fig. 1.

Not rare in the Laminarian zone, always on *Halidrys siliquosa*: Salcombe Bay; Torbay, under Berry Head; Plymouth; "Polperro and Goran" (*Couch*).
In the original description of this beautiful species ('Annals' for November 1851) I have stated that the polypides are furnished with a gizzard. From subsequent observation, however, I am inclined to doubt whether this is the case or not. The point must be reserved for future determination.
The description and figure of *Valkeria Cuscuta* in 'The Cornish

Fauna' must be referred to the *Mimosella*. Mr. Couch himself remarks upon the discrepancies between his own account of this species and those given by Ellis, Fleming, Thompson, and Johnston, and says of the form which he had in view, "If we suppose their descriptions to have been taken from injured specimens, this in a similar condition closely resembles them; otherwise it must be considered a new species." He does not notice the mobility of the cells, or their biserial arrangement; but the characters which he gives are those of the *Mimosella*, and not of the *Valkeria*. His figure also is evidently intended to represent the former.

In Dr. Johnston's collection, now deposited in the British Museum, there are specimens of the *Mimosella* which he had received from Mrs. Griffiths, ranked under *Valkeria Cuscuta*.

Mimosella gracilis grows in tangled masses on the *Halidrys*.

6. Bowerbankia, Farre.

B. imbricata, Adams.

Both forms occur—the *densa* of Farre, and the erect and branched variety, which Mr. Alder is inclined to consider specifically distinct. The former is met with abundantly in tide-pools, growing in small tufts on the stems of *Corallina officinalis*, and creeping over the under surface of stones between tide-marks. The latter is also littoral, and is sometimes as much as 3 inches in height. In colonies of the variety *densa*, cells are commonly found, laden with large yellow ova, one or two being present in each. In such cases the polypides have always disappeared, the eggs about filling the interior.

7. Avenella, Dalyell.

1. *A. gigantea*, Busk.

Farrella gigantea, Busk, Mic. Journ. vol. iv. p. 93, pl. 5. fig. 2.

Salcombe Bay, profusely investing *Salicornaria farciminoides*. The specimens are inferior in size to Mr. Busk's from Tenby, but otherwise agree exactly with his description.

2. *A. dilatata*, Hincks, Microsc. Journ. vol. viii. p. 279, pl. 30. fig. 7.

On *Flustra*, probably not uncommon.

There has been much confusion about the species of *Avenella*. The form here intended is a common parasite of various kinds of *Flustra*. I have it also spreading over shells dredged off the Isle of Man. In the latter habitat, the spinous expansions of the creeping fibre, which constitute a striking character, are well displayed; but on the *Flustra* they are detected with diffi-

culty. The cells, however, are sufficiently well marked. They are stout, sessile, of equal size throughout, somewhat quadrangular, opake, and of a very dark-brown colour when dried. This seems to be the form which Mr. Alder has identified with the *Avenella fusca* of Dalyell (Northumberland Catal. p. 69). The latter, however, I have no doubt, is a distinct species. Its cells are smaller and more slender, with a tendency to assume a bent form. They taper slightly both towards the base and the upper extremity; and the opacity is due to a peculiar constitution of the ectocyst, resembling that which Mr. Busk has described in the case of *Farrella gigantea* (Microscop. Journ. vol. iv. p. 93). The creeping fibre is also perfectly simple. I have specimens from Professor Wyville Thomson, which agree in all respects with Sir John Dalyell's figure.

Avenella gigantea differs from the *A. fusca* in size and in the shape of the cell.

Mr. Busk unites *Avenella* with *Farrella*. But perhaps the species with sessile and opake cells and numerous tentacles are entitled to distinct generic rank.

Order **PHYLACTOLÆMATA**, Allman.

Suborder **Pedicellinea**, Gervais.

Fam. **Pedicellinidæ**.

PEDICELLINA, Sars.

1. *P. echinata*, Sars.

Very common: between tide-marks; on *Vesicularia* from the Brixham trawl-stuff, &c.

2. *P. Belgica*, Van Beneden.

Exmouth, on weed in rock-pools.
[Filey, between tide-marks; Llandudno.]

3. *P. gracilis*, Sars.

Common: under stones, Salcombe; Torbay (8 fathoms), &c.
[Lamlash Bay; Filey; Llandudno; Ramsay, Isle of Man.]

Suborder **Lophopea**, Allman.

Fam. **Plumatellidæ**, Allman.

PLUMATELLA, Lamarck.

P. repens, Linn.

Stoke, near Plymouth.

I have not had the opportunity of investigating the freshwater Polyzoa of Devon and Cornwall; and none are included in

Couch's 'Cornish Fauna' but the *Fredericella Sultana*, which has been found near Penzance. There can be little doubt, however, that many of the species might be discovered by careful examination.

EXPLANATION OF PLATE XVI.

Fig. 1. *Mimosella gracilis*, Hincks, nat. size.
Fig. 2. *Arachnidia hippothooides*, n. sp., magnified : 2*a*, a single cell, more highly magnified.
Fig. 3. *Discoporella flosculus*, n. sp., nat. size and magnified : 3*a*, side view of cells; 3*b*, one of the tubular orifices in the centre of the disk.

LII.—*On the supposed Bilateral Symmetry of the* Ctenophora. By Fritz Müller*.

In radiate animals we can distinguish *only* the front from the back, *or* the top from the bottom; in bilateral animals we can *simultaneously* distinguish the front from the back, *and* the top from the bottom. Radiate animals are divisible into symmetrical parts through as many planes as there are rays present; bilateral ones only into symmetrical halves through a single plane: radiate animals have an axis at the intersection of the above planes; bilateral ones only the median plane, and no axis. In radiate animals only the parts situated in the axis can be present singly; all the parts in the middle and on the borders of the rays are repeated to the number of the rays, all the other parts to twice this number. In bilateral animals all parts situated in the median plane may occur singly, and all parts out of this plane exist in pairs.

If the divisional planes of the rays be allowed to turn round the axis, retaining their relative position, the animal will constantly be cut into congruent parts; bilateral animals are not divisible into congruent parts. Each individual ray of a radiate animal is bilaterally symmetrical; bilateral animals are not divisible by planes parallel to their longitudinal direction into fragments which are again bilaterally symmetrical.

When the rays are in pairs, therefore, in 2-, 4-, or 6-rayed animals, every plane passing through the axis cuts the body into congruent halves, and each of these sections is again cut through the axis into congruent halves. Bilateral animals (as also Radiata with an uneven number of rays) are not divisible into congruent halves; a right half cannot be replaced by a left one, nor can an entire animal be made out of two right halves of congruent animals. If, on the other hand, two even-rayed animals were cut in the same way into congruent halves, any two

* Translated by W. S. Dallas, F.L.S., from Wiegmann's Archiv, 1861.